

CLAIMS

1 A device for detecting a microparticle in a fluid, the microparticle
2 being tagged with a fluorescent substance, the fluorescent substance emitting
3 fluorescent light when exposed to electromagnetic radiation, the device comprising:
4 a capillary chamber;
5 a fluid delivery system coupled to the capillary chamber, the fluid delivery
6 system capable of introducing the microparticle and the fluid into the capillary
7 chamber;
8 a source of electromagnetic radiation positioned in proximity to the capillary
9 chamber to expose the fluorescent substance to electromagnetic radiation; and
10 a detection device configured to measure fluorescent light emitted from the
11 fluorescent substance when the microparticle is in the capillary chamber.

1 2. The device of claim 1, wherein the microparticle is a microorganism.

1 3. The device of claim 1, wherein the microparticle is a bacterium, virus,
2 or parasite.

1 4. The device of claim 1, wherein the microparticle is a CD4 cell.

1 5. The device of claim 1, wherein the microparticle is a fluosphere.

1 6. The device of claim 5, wherein the fluosphere has been ingested by a
2 filtro-feeder.

1 7. The device of claim 6, wherein the filtro-feeder has a feeding rate
2 sensitive to a toxicant level in the fluid sample.

1 8. The device of claim 1, wherein the fluorescent substance is a dye-
2 conjugated antibody.

1 9. The device of claim 1, wherein the fluorescent substance is a DNA
2 stain.

1 10. The device of claim 1, wherein the fluorescent substance has a
2 magnetic charge.

1 11. The device of claim 10, further comprising:
2 a magnetic element positioned in a surrounding relationship to the capillary,
3 the magnetic element having a magnetic charge which repels the fluorescent
4 substance.

1 12. The device of claim 1, wherein the fluid delivery system is a syringe
2 coupled to a syringe pump.

1 13. The device of claim 1, wherein the fluid delivery system is a peristaltic
2 pump.

1 14. The device of claim 1, wherein the source of electromagnetic radiation
2 is at least one laser.

1 15. The device of claim 1, wherein the detection device is an array of
2 detectors.

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1 16. A device for detecting a fluorescent substance tagged to a
2 microparticle, comprising:
3 a single capillary flow-carrier system for transporting the microparticle past a
4 selected location;
5 a source of electromagnetic radiation for irradiating the substance tagged to the
6 microparticle; and
7 a detection system for measuring fluorescent light emitted from the substance
8 at the selected location.

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1 17. The device of claim 16, wherein the source of electromagnetic
2 radiation comprises a source of light.

1 18. The device of claim 17, wherein the source of light comprises a laser.

1 19. The device of claim 16, wherein a plurality of microparticles are
2 individually transported past the selected location at a substantially uniform velocity.

1 20. The device of claim 16, wherein the microparticle is an organism.

1 21. The device of claim 16, wherein the microparticle is a fluosphere.

1 22. The device of claim 21, wherein the fluosphere is ingested by a filtro-
2 feeder.

1 23. The device of claim 22, further comprising a device for exposing the
2 filtro-feeder to a toxic substance.

1 24. The device of claim 23, wherein the fluorescent substance is ingested
2 by the filtro-feeder, and exposure of the filtro-feeder to the toxic substance affects the
3 rate of ingestion of the fluorescent substance by the filtro-feeder.

1 25. The device of claim 24, further comprising means for calculating the
2 ingestion rate as a function of the amount of fluorescent light emitted from the
3 fluorescent substance at the selected location.

1 26. The device of claim 16, wherein the fluorescent substance has a
2 magnetic charge.

1 27. The device of claim 26, further comprising:

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a magnetic element positioned in a surrounding relationship adjacent to the selected location, the magnetic element having a magnetic charge which repels the fluorescent substance.

28. A method for detecting a microparticle tagged with a fluorescent substance, comprising:
transporting the microparticle to a selected location;
irradiating the fluorescent substance tagged to the microparticle; and
measuring fluorescent light emitted from the fluorescent substance at the selected location.

29. The device of claim 28, wherein the microparticle is a bacterium.

30. The device of claim 28, wherein the microparticle is a virus.

31. The device of claim 28, wherein the microparticle is a parasitic cyst.

32. The device of claim 28, wherein the microparticle is a CD4 cell.

33. The device of claim 28, wherein the microparticle is a fluosphere.

34. The device of claim 33, wherein the fluosphere has been ingested by a filtro-feeder.

35. The device of claim 34, wherein the filtro-feeder has a feeding rate sensitive to a toxicant level in the fluid sample.

36. The device of claim 28, wherein the fluorescent substance is a dye-conjugated antibody.

37. The device of claim 28, wherein the fluorescent substance has a magnetic charge.